What is claimed is:

1. A crosslinker for crosslinking matrix materials, which comprises functionalized polyhedral oligomeric silicon-oxygen cluster units of the formula

$$[(R_aX_bSiO_{1.5})_m(R_cX_dSiO)_n(R_eX_fSi_2O_{2.5})_o(R_gX_hSi_2O_2)_p]$$

with a,b,c = 0-1; d = 1-2; e,f,g = 0-3; h = 1-4; m+n+o+p ≥ 4; a+b = 1, c+d = 2; e+f = 3 and g+h = 4;

R = hydrogen atom, alkyl, cycloalkyl, alkenyl, cycloalkenyl, alkynyl, cycloalkynyl, aryl, heteroaryl group or polymer unit, which are in each case substituted or unsubstituted or further functionalized polyhedral oligomeric silicon-oxygen cluster units, which are attached by way of a polymer unit or a bridging unit,

X = oxy, hydroxyl, alkoxy, carboxyl, silyl, alkylsilyl, alkoxysilyl, siloxy, alkylsiloxy, alkoxysiloxy, silylalkyl, alkoxysilylalkyl, alkylsilylalkyl, halogen, epoxy, ester, fluoroalkyl, isocyanate, blocked isocyanate, acrylate, methacrylate, nitrile, amino, phosphine group or substituents of the type **R** containing at least one such group of the type **X**,

the substituents of the type **R** being identical or different and the substituents of the type **X** being identical or different.

2. The crosslinker as claimed in claim 1, wherein at least one of the substituents of type **X** contains an amino group.

3. The crosslinker as claimed in claim 1 or 2, wherein at least one of the substituents of type **X** contains an isocyanate or blocked isocyanate group.

4. The crosslinker as claimed in at least one of claims 1 to 3, wherein at least one of the substituents of type **X** contains an acrylate or methacrylate group.

5. The crosslinker as claimed in at least one of claims 1 to 4, wherein at least one of the substituents of type **X** contains an alkoxysilyl or alkoxysilylalkyl group.

6. The crosslinker as claimed in at least one of claims 1 to 5, wherein at least one of the substituents of type **X** contains an epoxy group.

7. The crosslinker as claimed in at least one of claims 1 to 6, wherein at least one of the substituents of type **X** contains a hydroxyl group.

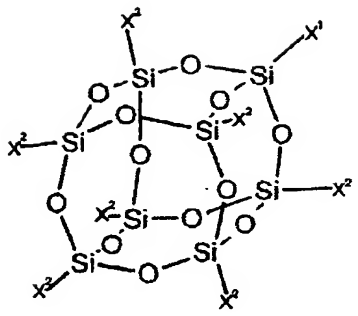
8. The crosslinker as claimed in at least one of claims 1 to 7, wherein at least two of the substituents are of the type **X**.

9. The crosslinker as claimed in at least one of claims 1 to 8, wherein at least two of the substituents of the type **X** are identical.

10. The crosslinker as claimed in at least one of claims 1 to 9, which has a molecular weight of at least 400 g/mol.

11. The crosslinker as claimed in at least one of claims 1 to 10, which comprises further compounds having crosslinking properties.

12. The crosslinker as claimed in at least one of claims 1 to 11, wherein the functionalized polyhedral oligomeric silicon-oxygen cluster unit is based on the structure **3**



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with X^1 = substituent of type **X** or **-O-SiX$_3$**, X^2 = substituent of type **X**, **-O-SiX$_3$**, **R**, **-O-SiX$_2$R**, **-O-SiXR$_2$** or **-O-SiR$_3$**.

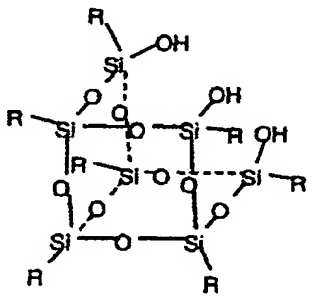
13. The crosslinker as claimed in at least one of claims 1 to 12, wherein the functionalized polyhedral oligomeric silicon-oxygen cluster unit is a functionalized oligomeric silasesquioxane unit.

14. The crosslinker as claimed in claim 13, wherein the silasesquioxane unit has a functionalized homoleptic structure, all substituents of type **R** being identical.

15. The crosslinker as claimed in claim 13, wherein the silasesquioxane unit has a functionalized heteroleptic structure, at least two of the substituents of type **R** being different.

16. The crosslinker as claimed in at least one of claims 13 to 15, wherein the functionalized oligomeric silasesquioxane unit is obtained by reacting silasesquioxane units having free hydroxyl groups with monomeric functionalized silanes of the structure **Y$_3$Si-X^I**, **Y$_2$SiX^{I}X^{II}**, and **YSiX^{I}X^{II}X^{III}**, the substituent **Y** being a leaving group selected from alkoxy, carboxyl, halogen, silyloxy, and amino groups, and the substituents X^I, X^{II}, and X^{III} are of the type **X** and are identical or different.

17. The crosslinker as claimed in at least one of claims 13 to 16, wherein the functionalized oligomeric silasesquioxane unit is based on the structure **4**, **5** or **6**



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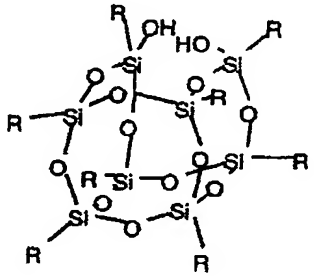

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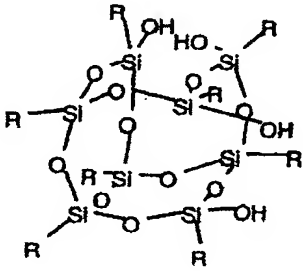

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the silasesquioxane unit being functionalized by way of at least one hydroxyl group.

18. The crosslinker as claimed in at least one of claims 1 to 12, wherein the functionalized polyhedral oligomeric silicon-oxygen cluster unit is a functionalized oligomeric spherosilicate unit.

19. A matrix which has been crosslinked by means of at least one crosslinker as claimed in at least one of claims 1 to 18.

20. The matrix as claimed in claim 19, which has been crosslinked by means of a combination of different

crosslinkers composed of at least one crosslinker as claimed in at least one of claims 1 to 18.

21. The matrix as claimed in at least one of claims 19 or 20, which comprises an organic and/or inorganic matrix material.

22. The matrix as claimed in at least one of claims 19 to 21, which comprises as inorganic matrix material glasses, mineral building materials and/or inorganic sinter compositions.

23. The matrix as claimed in at least one of claims 19 to 21, which comprises as organic matrix material an elastomer or a thermoplastic or thermoset.

24. The matrix as claimed in claim 23, wherein the organic matrix material is a plastic selected from polyethylene, polypropylene, polyester, copolyester, polycarbonate, polyamide, copolyamide, polyurethane, polyacrylate, polymethacrylate, polymethacrylate copolymer, polysiloxane, polysilane, polytetrafluoroethylene, phenolic resin, polyoxymethylene, epoxy resin, polyvinyl chloride, vinyl chloride copolymer, polystyrene, styrene copolymer, ABS polymer, alkyd resin, unsaturated polyester resin, nitrocellulose resin, and rubber.

25. The matrix as claimed in at least one of claims 19 to 24, wherein the silasesquioxane unit of the crosslinker forms at least one covalent bond to the matrix material.

26. The matrix as claimed in at least one of claims 19 to 25, wherein the matrix material contains from 0.05 to 100% by weight of the crosslinker.

27. The use of a crosslinker as claimed in at least one of claims 1 to 18 for producing plastics, sealing compounds, paints, printing inks, adhesives, glasses, ceramics, mineral building materials, concrete, mortar, plaster, and coatings of ceramics, glasses, plastics, and chips for the computer industry.

28. A method of crosslinking matrix materials to form a solid matrix, which comprises using a crosslinker as claimed in any of claims 1 to 18.